

control flux path and the length of each air gap in said bearing is limited to the physical separation of the confronting surfaces. - -

I. DRAWING OBJECTIONS

The Action objected to the drawings under 37 C.F.R. 1.83(a) and requested that the "confronting surfaces" be shown or canceled from the claims. Applicant has submitted herewith substitute drawing sheets 5/9 - 9/9 (Fig. 6-14) indicating the element numbers of the confronting surfaces. Support for the amendment can be found throughout the specification, e.g., page 6, lines 3-15 and in the originally filed Figures 6-14.

II. CONCISE EXPLANATION OF THE CLAIMED INVENTION

The present invention reduces both the required permanent magnet rings (116, 117) and the number of control coils in a magnetic bearing (a single coil 115). The magnet rings 116, 117 are reduced to one per side for simplified assembly and lower cost. They are assembled onto the ferrous members 113 and 114, without the need for special poles (32 in Meeks). Also, the present invention discloses a ferrous member that is magnetically linked throughout, or is a "continuously magnetic ferrous member." (e.g., Figure 6 wherein rings 113 and 114 are continuously linked, creating a continuously magnetic ferrous member). Thus, a smaller bearing can be achieved with this greatly improved geometry that optimizes the placement of magnets, iron and a control coil for minimum size and cost.

The control field path of the present invention is also a significant improvement in design. The control field path 122 is at a minimum to reduce magneto-motive force (mmf) drop of this field as a result of the iron path in 113 and 114. Only two air gaps are required to be crossed by the control field 122. Thus, minimum power is required to achieve a control magnetic field in the air gap.

III. CLAIMS 1, 3, 6, AND 12 ARE NOVEL AND ARE NOT ANTICIPATED BY MEEKS,
U.S. PATENT NO. 5,250,865

The pending claims are 1, 2, 3, 5, 6 and 7. The Action rejected Claims 1-3, and 5-7 under 35 U.S.C. 102(b) as allegedly being anticipated by Meeks (U.S. Patent No. 5,250,865).

1. ELEMENTS OF THE CLAIMED ARTICLE

The Applicant has amended claim 1 as suggested by the Examiner and has also amended claim 1 to "at least one continuously magnetic ferrous member." The present invention discloses a ferrous member that is magnetically linked throughout, or is a "continuously magnetic ferrous member." (e.g., Figure 6 wherein rings 113 and 114 are continuously linked), creating a continuously magnetic ferrous member. Although the ferrous member of the present invention may be constructed of multiple pieces, the magnetic iron is linked throughout the bearing stator ferrous member.

2 THE MEEKS PATENT DOES NOT ENABLE OR TEACH THE CLAIMED COMPOUND

In contrast to the present invention, Meeks discloses an electromagnetic thrust bearing utilizing four permanent magnets 30 for bias field using two sets of annular magnet rings 20 per side of the thrust bearing. Thus, the magnet rings 20 of Meeks are disconnected and are not magnetically continuous which results in the control field path 28 of Meeks going the maximum length path possible in the bearing, and crossing over two sets of axial air gaps. Thus, Meeks requires more than double the power (due to the iron mmf drop) to achieve the same level of control field in the air gaps. The result is the coil for the present invention is effectively less than half the size of total control coil size required for Meeks.

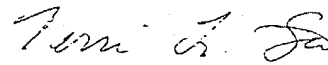
Also in contrast to the present invention, Meeks uses two identical control coils 22, which are used in unison, to create the bias field to result in axial forces. The Applicant's invention uses only a single coil 115 lowering the size and cost of the thrust bearing.

Therefore, the Meeks reference does not anticipate the claimed invention and the Applicant requests that this rejection be withdrawn.

IV. CONCLUSION

The Applicant has provided arguments that overcome the pending rejections. The Applicant respectfully submits that the Action's conclusions that the claims should be rejected are unwarranted. For all the reasons presented above, it is submitted that the claims are in condition for allowance. Reconsideration of the rejections and a Notice of Allowance is requested. Should there be any questions, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,



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